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A University's Organizational Culture as Expressed by Its Approach to Physical Education During COVID-19: The Case of a Science and Engineering Higher Education Institute

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Due to the rapid growth in knowledge, many higher education institutions face the challenge of deciding what to eliminate from their core study programs and to be replaced by more updated topics. We propose that such decisions can be made by examining the organizational culture, in general, and in particular, during extreme times. Such an examination will indicate to the organization what its core activities are, which cannot be eliminated, and which activities can be relinquished if the organization faces difficult times. This paper illustrates this assertion by analyzing how the organizational culture of the Technion is reflected in its general approach to physical education, specifically during the COVID-19 pandemic.

Unlike many academic institutions around the world that shut down their physical education programs during the pandemic, the Technion continued operating its physical education programs under uncertain conditions, according to the spread of the pandemic and the national regulations, in a variety of formats ranging from online to on-campus. Based on Schein's model of organizational culture (Schein 1985, 1990), we show that the way in which the Technion addressed physical education during the pandemic reflects its organizational culture. Specifically, the extreme uncertain conditions that prevailed during the pandemic further highlight the importance that the Technion attributes to the contribution of physical education to students' well-being from several perspectives: motoric, social, emotional, cognitive, and academic.

The paper is structured as follows. Following a brief background presenting different approaches to physical education in science and engineering research universities (Section 2.1), the influence of the pandemic on higher education (Section 2.2), and Schein's framework of organizational culture (Section 2.3), we describe the research framework (Section 3). This includes the research objectives and questions (Section 3.1), a description of the research environment (Section 3.2), and a presentation of the data collection tools used (Section 3.3). In Section 4, we analyze the Technion's organizational culture through the lens of Schein's framework of organizational culture, relying on evidence collected during the pandemic with respect to physical education. We conclude in Section 5.

Background

Physical education in science and engineering higher education

Different science and engineering undergraduate programs express different approaches to physical education. On the one extreme, many higher education institutions do not require their students to take any physical education courses to complete their undergraduate studies. We will not address this approach. Rather, in this sub-section, we describe several physical education programs offered in higher education institutions in general and, specifically, in research universities of science and engineering like the Technion.

Higher education institutions that offer physical education programs exhibit one of two approaches. According to the first approach, as it is implemented by the Technion, physical education is mandatory as part of the students' undergraduate degree. Similar to the Technion, MIT also provides a variety of instructional physical activity courses for undergraduate students to complete the institute's general physical education and wellness requirement (four courses, 8 points) as well as the swim requirement (swim course or swim test). At Rice University, undergraduates must successfully complete one Lifetime Physical Activity Program (LPAP) course (1 credit) in order to satisfy the graduation requirement. Students may use up to four LPAP courses (4 credits in total) towards the total credits necessary for graduation. According to the second approach, physical education is offered by some universities as a minor or a full undergraduate program, and some offer it also as a graduate degree. For example, UC Berkeley's Physical Education Program offers a minor in health and wellness and a variety of courses in dance, fitness, aquatics, sports, and martial arts ranging from a beginner's level to more advanced levels.

In both cases, the requirement to engage in physical education reflects the approach whereby physical education is perceived and treated as part of the core of undergraduate science and engineering study programs.

Influences of COVID-19 on higher education

As far as we know, physical education activities were shut down on most higher education campuses as soon as the pandemic broke out; the campuses closed and learning and teaching moved to online platforms. As highlighted in various publications, the pandemic, in general, and the closed campuses, in particular, significantly influenced a variety of aspects of academic life, including mental health. To overcome this problem, different solutions were offered, such as tele-mental health services (Kafka, 2021), in-person or virtual counseling services and campus well-being events (Markowitz, 2021), and early identification of students who may be in need of mental health services (Jenzabar, 2021). Another approach to coping with mental challenges, discussed in this paper and which was already known prior to the pandemic, is to engage in physical activities (Schuch et al., 2018). Specifically, physical education reduced students' mental stress during the pandemic thanks to (a) the continued exercising itself, and (b) the students' realization that they need not be concerned about the timely completion of their studies, since not only did the academic courses continue to be offered, but also the physical education courses continued as normal.

Organizational culture

The term *organizational culture* refers to the norms, values, and beliefs of an organization, from which the employees' behavior in general, and the way individuals interact with each other and with people outside the company in particular, are derived. Edgar Schein (1985, 1990) presented a three-level hierarchical model for describing organizational cultures (Figure 1).

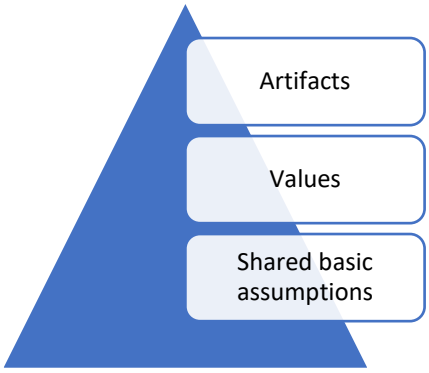

Figure 1. Schein's model of organizational culture

The basic level, the unspoken and unseen level, is that of the *shared basic assumptions* that reflect how the organization really works, regardless of its spoken values (the second level) or the visible artifacts (the upper level). The second level of the organizational culture consists of the *values* delivered by the organization. In a healthy organizational culture, these values are consistent with the shared basic assumptions, and the members of the organization work according to those values. The third level, the visible level, consists of *artifacts*, i.e. what is seen in the organization. These, as it turns out, have a huge impact on the behavior of the members of the organization. The artifacts level includes the dress code, the spoken language, the rank hierarchy, the office allocation and furniture, working hours, facilities offered to the members of the organization, the way the parking lots are organized, and so on.

Organizational culture is shaped in a long process that reflects the main events the organization experienced, how it coped with challenges, and how it leveraged opportunities. The actual culture of an organization is determined by the tightness and consistency between the three levels. The stronger the consistency between the levels, the clearer the organizational culture is to its members and, as a result, they know how to behave without needing to constantly consider what the correct behavior is.

Research Framework

The research was reviewed and approved by the Behavioral Sciences Research Ethics Committee of the Technion. Requirement for consent was waived by the ethics committee since the data was collected anonymously.

Research objective and research questions

The research objective was to document and characterize the process that the Technion underwent during the pandemic with respect to its undergraduate physical education programs.
This research objective led to the following research questions:

- How did the Technion manage its physical education programs during the pandemic?

- Is the Technion's organizational culture reflected in the way in which the Technion managed its physical education programs during the pandemic? If it is, how? If not, why?

Research environment

The Technion

The Technion, which is the first higher education institute established in Israel, will celebrate its 100th anniversary in 2024. It is a leading science and engineering research university and ranks among the top 100 universities worldwide (83th in 2022)[1]. The Technion is the main provider of scientists and engineers to Israel's industry, and its graduates play a significant role in the growth of the Israel's economy and its technological competitive advantages.
Some 10,000 undergraduate students study in the Technion 17 science and engineering faculties. In addition, the Department of Humanities and Arts provides elective courses in social sciences and liberal arts and is in charge of the Physical Education Unit.

Physical education at the Technion

Many sports facilities are available on the Technion campus, including three gymnasiums, a fitness center, an Olympic sized swimming pool and two outdoor, 25-meter long swimming pools, tennis and squash courts, a basketball court, a turf field, a running track, and a perimeter track (see Figure 2). All of these facilities serve the entire Technion community.

Physical education courses and team sports are an integral part of the undergraduate study programs at the Technion. These courses grant students academic accreditation and their grade is included in the calculation of their academical average. During their undergraduate studies, students are required to accumulate 2 credit points (out of 155/120 credits in 4/3 years programs, respectively) by participating in either courses (1 credit point per course of 13 weekly lessons) or team sports (1.5 credit points, 13 weeks, twice a week). Most students choose to take more than just the mandatory 2 credits in physical education.

In regular semesters, students are offered more than 200 courses in 51 sports categories, and at all levels: beginners, advanced, and competitive teams. Sports categories include HIT (high intensity training), Pilates, Zumba, TRX, volleyball, basketball, soccer, handball, rugby, functional training, kickboxing, freestyle aerobics, jazz dance, ballet, salsa, Yoga, swimming, AquaForza, water exercises, tennis, badminton, squash, karate, judo, taekwondo, ninjutsu, karting, sailing, kayaking,

[1] See the Shanghai Ranking

wave and SUP surfing, track and field, long-distance running and more. In addition, a special course for students with disabilities is offered and special groups for freshmen are available. On average, courses include up to 25 students.

The grading policy for the sports courses is based on the student's attendance (65% of the final grade, with a minimum requirement of 8 lessons for courses and 14 for teams) and on the teacher's evaluation of the student's progress or, alternatively, on a measurable evaluation test (35% of the final grade).

Figure 2. Some of the Technion's various sport facilities

Data collection tools

Data was collected using the following data collection tools.

Document analysis:

> Systematic documentation of the implementation of physical education during the pandemic. The head of the Technion's Physical Education Unit and first author of this paper maintained very systematic documentation of the different physical education-related events that took place during the pandemic. This documentation included regulations, mail correspondence, memos, etc. Eventually, this detailed documentation served as the basis of our analysis. Appendix 1 presents the documents we analyzed.
>
> National documents and websites (e.g., Wikipedia pages on The Influence of the Corona Pandemic on the Educational system and the Corona Pandemic in Israel).

Student surveys: Two end-of-semester surveys were distributed to students who were enrolled in physical education courses during the first two semesters of the pandemic (Spring 2019-2020 and Winter 2020-2021) in which the format of physical education courses changed according to national regulations. (The relatively high response rate to both questionnaires should be noted as it reflects the importance the students attributed to physical education, especially during the pandemic.)

The first survey (Document 17 in Appendix 1) was distributed at the end of the Short Spring 2019-2020 semester (on July 31, 2020). This semester started late due to the outbreak of the pandemic and took place outdoors, in small groups, after the first lockdown in Israel was lifted. Of the 509 students who took courses in this semester (see Table 1), 208 completed this survey (a 40% response rate).

The second survey (Document 21 in Appendix 1) was distributed at the end of the online Winter 2021 semester, in which all physical education courses took place remotely. Of the 1070 students who took physical education courses this semester (see Table 1), 376 completed this survey (a 35% response rate).

Findings: Analysis of the Technion's organizational culture during the pandemic with respect to physical education

In this section, we analyze, by Schein's model, how the organizational culture of the Technion is reflected in the way that it managed its physical education programs during the turbulent period of the pandemic.

Table 1 presents the number of students who enrolled in physical education courses in each semester during the pandemic until life went back to normal (at the start of the 2021-2022 academic year). For the sake of comparison, we also present these numbers for the period prior to the outbreak of the pandemic.

Appendix 2 provides details of the Technion's activities and policy with respect to physical education in each semester during the pandemic. This detailed description sets the stage for the analysis of the Technion's culture during the pandemic with respect to physical education, presented in this section.

We focus on the first two semesters of the pandemic as they were the most extreme in terms of the changes that took place in the setting of the physical education lessons: During the first of those two semesters, the lessons took place on campus in small groups and in the second semester, they took place remotely via Zoom.

Table 1. The number of students enrolled in physical education courses during the pandemic, by semester

Semester	**COVID-19 events**	**On-campus/online**	**# of students enrolled in physical education courses**
Prior to the pandemic			
Winter 2018-2019	-	On-campus	3340
Spring 2018-2019	-	On-campus	3229
Summer 2018-2019	-	On-campus	123
Winter 2019-2020	-	On-campus	3266
COVID-19 arrived in Israel			
Spring 2019-2020 (March 18-July 2, 2020, 13 weeks)	Lockdown	Online, two theoretical courses	400
Short Spring 2019-2020: Added after the first lockdown (May 31-Juy 31, 2020, 9 weeks, Document 11)	Purple Regulations (social distancing, small groups, sports activities adjusted to the regulations)	On-campus	509
Summer 2019-2020	Purple Regulations	On-campus	108
Second academic year of the pandemic			
Winter 2020-2021	Campus closed	Online	1070
Spring 2020-2021	Green Regulations (only vaccinated or recovered students can participate)	On-campus	1987
Summer 2020-2021	Green Regulations	On-campus	133
Third academic year of the pandemic – Almost back to normal			
Winter 2021-2022: Towards the end, the Omicron variant arrived and compulsory attendance was canceled.	Green Regulations	On-campus	3259
Spring 2021-2022	No restrictions	On-campus	3291
Summer 2021-2022	No restrictions	On-campus	145

As we shall see, the three levels of Schein's model, as reflected in the Technion's activities with respect to physical education during the pandemic, support and reinforce each other. This coherence between the expression of the three levels of Schein's model of the Technion's culture

with respect to physical education in such a time of crisis further attests to how the Technion's organizational culture is exhibited with respect to physical education in regular times as well.

Basic assumptions: Excellent multi-faceted science and engineering education

The basic assumptions level of Schein's model refers to how the organization works, regardless of what is verbalized or presented. The basic assumption of the Technion's culture highlighted in this section is the provision of *excellent and multi-faceted science and engineering education*[2].

As a leading science and technology research university, the Technion's vision is to be "among the world's top ten, dedicated to the creation of knowledge and the development of human capital and leadership, for the advancement of the State of Israel and all humanity."[3] As part of this academic excellence, physical education is included in the undergraduate program to deliver its contribution to academic achievements and emotional well-being. This commitment to excellence led the Technion management to decide that it will not let the pandemic detrimentally affect its students' studies, in general (e.g., study time will not be extended and graduation will not be postponed, see Document 6 in Appendix 1) and, specifically, that physical education, which has a recognized contribution to academic excellence, will continue.

This decision delivers the message that science and engineering education is multi-faceted and is not based solely on theoretical lessons. In this spirit, all undergraduate science and engineering programs at the Technion include actual wet labs, which are not replaced with simulations as is the case in many academic institutions. During the pandemic, therefore, both wet labs and physical education lessons continued in accordance with national regulations. In other words, the extreme situation caused by the pandemic exposed the Technion's basic assumption that physical education is part of an excellent multi-faceted scientific and engineering education.

The multifaceted contribution of physical education to students' well-being was expressed by the students in the questionnaire distributed to them at the end of each of the first two semesters of the pandemic. In both semesters, the students were asked whether the physical education course they took contributed to various aspects of their life (motoric, social, emotional, cognitive, etc.), and if it did – how? Table 2 presents illustrative quotes regarding each such aspect.

Table 2. Students' quotes regarding the multi-faceted nature of physical education during the pandemic

Facet	Short Spring 2019-2020 semester in small groups	Winter 2020-2021 online via Zoom
Motoric: Due to the circumstances, most of the students indicated that	• Physical activity is important at any time and in any circumstance.	• The course contributed to me a lot in improving my physical fitness. I began running and the

[2] The Technion also excelled in sports education and, prior to the pandemic, ranked second (after the Wingate Academic College whose focus is sports) in competitions organized by the national Academic Sports Association. The many cups won by the Technion's competitive teams are on display in the Sports Center.

[3] Technion vision: https://www.technion.ac.il/en/technion-vision/

they improved their physical abilities. They also mentioned the fact that they can apply what they learned in the course in other times as well.	All the more so when it comes to group sports that are not otherwise possible. • The course contributed because other than during the classes, I didn't get up and do any sports. It was good for me to know that I have it once a week. Also, the instructor made sure to vary the work of the different muscles.	course provided me with a framework in which I could do sports in a controlled and regular manner. • The course improved my quality of life a lot! In the Spring semester my body simply became stiff from sitting endlessly at the computer, when even the short walks from class to class were gone. I suffered from terrible back pain! And this semester, a short workout once a week and I'm already not suffering from all of that. I think that during the corona period the importance of a sports course that makes us get up and move a little is 100 times greater than during a regular semester!
Social: Not surprisingly, in times of social distancing, the physical education courses enabled the students to fulfill their basic need for social interaction.	• I met new people, something that I missed very much during that period, and I felt a sense of success. • I finally saw people rather than black rectangles with names. I went outside of the apartment – significant contributions.	• The teacher let us run and then come back and share the results of the run. It felt really good and gave us reason to leave the house during such a time when everyone was stuck at home all the time. • The course was wonderful. We met up, three students, in the same apartment, to do the class and it was a good experience. I was very happy that this is how we did the course.
Emotional: This facet received the most attention in students' responses. It includes improving the mood, refreshing the mind and body, releasing pressure and tension, and the option of leaving home and being in the open air. In	• It affected me very much! It affected me emotionally in an amazing way. It influenced me positively in all aspects. • The sports activity helped a lot in coping emotionally with the	• It saved the semester for me from a mental and physical perspective (otherwise I would have barely moved). • I'm happy I took an online sports course. Doing sports during the semester and going outside for workouts were an important part of maintaining my sanity and my health. I liked

the Short 2019-2020 semester, during which classes took place in small groups, many students also indicated the personal attitude of the teachers which is not possible in regular semesters in larger groups.	pressure of my studies and these times. • The course helped a lot with my anxieties about the present times. Even at the height of the exams, I wanted to go to class in order to leave the house, meet people, and of course do sports.	the outdoor aerobic workouts (walking/running) more than the body weight-based workouts at home. […] Getting ready for class and connecting to the class were easy and required almost no effort. A very convenient sports class.
Academic: This facet includes learning new sports activities, improving personal management skills, and increasing awareness of health issues.	• It helped me keep a normal daily routine (a central anchor). • It absolutely contributed. The coach explained a lot of things to us that I hadn't known about sports and thanks to him I'm continuing to persist in doing physical activity.	• I took swimming (via Zoom) in order to learn how to swim. Nevertheless it was fun and I got a lot of flexibility back. I got a good background on which exercises to do. […] In general, I don't have a background in sports and how to do a workout correctly is something that I am interested in learning. • Thanks to the sports course, I began a weekly workout routine and I learned a variety of activities that I will be happy to continue doing in the future.
Cognitive: With respect to this facet, the students indicated the contribution of physical education to their ability to concentrate and study during this intense and tense period of time.	• It helped me improve my concentration. • Going outside to do sports improved my ability to get back to my studies. • It occupied my head with other things besides my studies.	• It contributed a lot! The sports class contributed greatly to coping with an atmosphere of constant sitting in front of the monitor and it also helped physically as well as mentally. • I'm very happy that I took the sports course during COVID. The second corona semester was even harder than the first, mentally, and sports really gave me a framework in which I could step out of my routine of sitting all day.

Values: Flexibility and adaptation to change

On the *values* level of Schein's model of organizational culture, as exhibited with respect to the Technion's physical education activities during the pandemic, we recognize the values of *flexibility*

and adaptation to change, which eventually support the Technion's basic assumption of providing an excellent multi-faceted science and engineering education. Specifically, in order to implement different physical education frameworks, flexibility had to be expressed. Similarly, the ability to adapt to change had to be exhibited in order to keep up with the frequent changes in the national regulations (sometimes on a daily basis) and the need to adjust the format of physical education courses accordingly. See Appendix 2 and Documents 2, 3, 6, and 8 in Appendix 1.

These values reflect the Technion's culture as part of the "startup nation" (Senor and Singer, 2011) and highlight several characteristics of Israelis in general: risk taking (Lautman, 2017) and acceptance of failure, on the one hand, and on the other hand, avoidance of uncertain situations (Hofstede 1991, 2001, 2011; Hofstede & Bond, 1988)[4], all of which have helped make Israelis outstanding entrepreneurs in general (Senor & Singer, 2011). By balancing these three characteristics with respect to physical education during the pandemic, the Technion took the risk of continuing to offer physical education during the pandemic, even at the price of failure (after all, who else dared teach physical education via Zoom in higher education institutions during the pandemic?). Yet, as we shall see when we discuss the *artifacts* level, as part of the characteristic tendency of Israelis to avoid uncertainly, the Technion formulated very strict rules that were implemented in the physical education lessons during the pandemic.

The values of flexibility and adaptation to change were supported also by the low power distance that characterizes the Israeli society. Power distance, which is another dimension of Hofstede's framework (Hofstede 1991, 2001, 2011; Hofstede & Bond, 1988), is defined as "*the extent to which the less powerful members of institutions and organizations within a country expect and accept that power is distributed unequally*"[5]. This characteristic enabled intensive, on-going communication between staff members of all Technion units, at all levels of seniority, who were involved in the decision-making processes that took place during the pandemic with respect to physical education (including the Physical Education Unit of the Humanity and Arts Department, the Undergraduate Studies office, the Center for the Promotion of Learning and Teaching, and the Technion management). Such intensive discourse was only natural thanks to the low power distance that characterizes the Technion, as part of Israel's culture.

Artifacts

The *artifacts* level completes the analysis of the Technion's organizational culture during the pandemic as exhibited with respect to physical education by showing how the visible things reflect and support the *basic assumptions* and *values* levels of Schein's model of organizational culture. With respect to the focus of this paper, i.e., physical education at the Technion during the pandemic, several artifacts were exhibited as described below.

Figure 2 shows the regular sport facilities available on the Technion campus; Figure 3 shows the facilities that were purchased or built especially for the outdoor physical education lessons that

[4] The high score that Israel receives on the 'avoidance of uncertain situations' dimension can be explained by the national security situation that forces it to be ready for all possible situations (Source: https://www.hofstede-insights.com/country-comparison/israel,the-usa/).

[5] Source: https://www.hofstede-insights.com/country-comparison/israel,the-usa/.

took place during the pandemic. This investment reflects the Technion's commitment to provide its students with a multi-faceted science and engineering education also during the pandemic (the *basic assumption* level), which could be executed thanks to the Technion's values of flexibility and adaptation to change (the *values* level).

But building new facilities was not sufficient. To provide a safe learning environment, strict regulations had to be formulated as well. This included the requirement to adhere to the Purple Regulations, which was facilitated by using 2-meter social distancing floor markings to ensure proper distance between students and determining the number of students in each group accordingly, offering masks at the entrance to the sports facilities to be taken off only during the class itself, placing disinfectants at the entrance to all sports facilities (both outdoor and indoor), and posting notices with the rules of required behavior. Furthermore, the students were encouraged to bring personal equipment from home, and public facilities and equipment were disinfected at the beginning and end of each class. Finally, in each class, the teacher (or someone on his or her behalf) was appointed to be in charge of COVID-19 compliance.

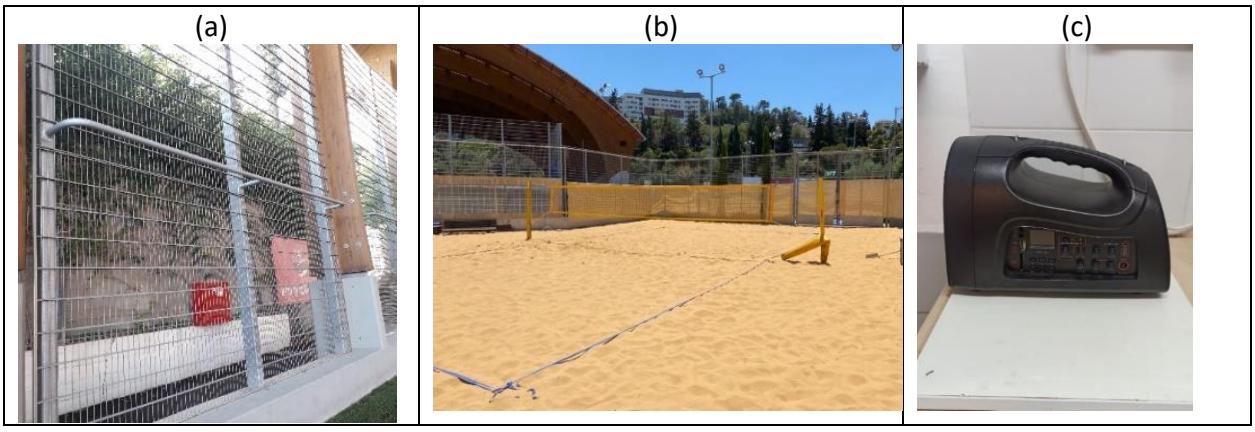

Figure 3. Outdoor facilities purchased or built at the Technion campus during the pandemic for outdoor physical education lessons: the TRX facility (a), the beach volleyball facility (b), and the wireless outdoor speakers purchased for the physical fitness courses: TRX, Pilates, functional, HIT, etc. (c).

Such strict rules are compatible with the *values* level of the Technion's organizational culture, which, as we saw, is supported by the tendency to avoid uncertainty. Indeed, the students mentioned these rules when they described the safe atmosphere they felt in the physical education classes they took during the pandemic. Following are several illustrative quotes from the survey distributed at end of the Spring 2019-2020 semester, which took place on campus in accordance with the Purple Regulations:

- It was evident that the issue of the coronavirus was very important to the person in charge of the course that took place in the gym. Thank you for understanding the situation and for the flexibility.

- It was especially important and beneficial in the present time to get out of the house and engage in physical activity. It is important and it contributed to me both physically and mentally! I think that it was done taking into account a calculated risk and adhering to the guidelines in a reasonable and good way!

- The green stickers in Gymnasium B helped us adhere to the guidelines of the Purple Regulations. I felt safe in terms of health – keep it up!

Furthermore, in that survey, in response to the question "Were you concerned about participating in the physical education courses in the 2019-2020 Spring semester?", 41.1% of the students declared that they were not at all concerned, 44.4% declared that they had some concerns, 11.6% noted that they were concerned, and the rest, 2.9%, said that they were very concerned. We should recall that this semester took place just after the first lockdown in Israel, and still about half of the students did not worry. Furthermore, in response to the question, "Did you feel safe from the health perspective during the lessons?", 83% indicated "I felt safe all the time" or "I felt safe".

Conclusions

The research objective was to document the process the Technion underwent during the pandemic with respect to its undergraduate physical education programs; eventually, it turns out that the analysis of this documentation reflects the organizational culture of the Technion.

We now answer the research questions:

1. **How did the Technion manage its physical education programs during the pandemic?**

   Appendices 1 and 2 present a detailed description of this process as well as the background for the analysis of the Technion's organizational culture as expressed with respect to physical education during the pandemic (described in Section 4). Instead of shutting down its physical education courses, the Technion continued with its physical education program in accordance with national COVID regulations. Thus, by continuing to offer physical education classes, not only did the Technion support its students' mental health and alleviate their stress, but it also further exhibited its belief in the importance of physical education, since organizational beliefs and values are usually tested during extreme times.

2. **Is Technion's organizational culture reflected in the Technion's physical education programs during the pandemic? If yes, how? If not, why?**

   As described in Section 4, the three levels of Schein's model of organizational culture, as reflected by the Technion's approach to physical education in general, and during the pandemic in particular, support and reinforce each other. For example, the *basic assumption* of providing excellent and multi-faceted science and engineering education led to the investment of financial resources in *artifacts* for outdoor facilities to improve students' well-being, including emotional and cognitive facets required for academic success, while demonstrating the *values* of risk taking and adaptation to change.

In general, the analysis of an organization's culture during extreme times reveals its basic assumptions regarding its treatment of its different activities and its allocation of its different resources during such times. Such analysis, when carried out in extreme cases, highlights which activities are valued and which can be eliminated without causing any harm. Based on these observations, the organization can characterize its culture by examining how these two kinds of activities are reflected in its artifacts, values, and basic assumptions as well as the coherence between these three levels of the organizational culture.

With respect to higher education institutions, such examinations can guide their decision process regarding the core curriculum that cannot be compromised even in the event of the imposition of various restrictions. Such restrictions can be either positive (e.g., competitions and the need to update study programs due to the increasing body of available knowledge) or negative (e.g., budget restrictions or a pandemic). The case of science and engineering education, discussed in this paper, is especially interesting due to the need to adjust the curriculum and the teaching methods also to new approaches implemented in this industry. Thus, for example, questions such as, "can interdisciplinarity be implemented and if yes, how?", can be answered by checking what organizational artifacts, values, and underlying assumptions support its adoption or alternatively, reject its adoption, as well as by examining the coherence between these levels of the organizational culture.

Looking back at the history of the Technion, we can see that in the past 70 years (since the early 1950s), physical education has been a mandatory component in all of the Technion's academic programs. What was initially a program that included one sports hall, two teachers, and three courses (physical fitness, artistic gymnastics, and ball games) grew in subsequent decades, as the physical education teaching staff was expanded, dozens of courses were added (totaling ~200 courses today) including team sports, and multiple facilities were constructed. Indeed, the founders of the Technion set the cornerstone for the working assumption that sees physical education as part of the excellent multi-faceted science and engineering education that the Technion provides its students.

References

Hofstede, G. (1991). *Cultures and Organizations: Software of the Mind*. London, UK: McGraw-Hill.

Hofstede, G. (2001). *Culture's Consequences: Comparing Values, Behaviors, Institutions and Organizations across Nations*. Thousand Oaks, CA: Sage (co-published in the PRC as Vol. 10 in the Shanghai Foreign Language Education Press SFLEP Intercultural Communication Reference Series, 2008)

Hofstede, G. (2011). Dimensionalizing Cultures: The Hofstede Model in Context. *Online Readings in Psychology and Culture*, Unit 2. Retrieved from http://scholarworks.gvsu.edu/orpc/vol2/iss1/8

Hofstede, G. & Bond, M. H. (1988). The Confucius connection: from cultural roots to economic growth. *Organizational Dynamics*, 16, 4-21.

Jenzabar (2021). Mental Health: The Elephant on Campus and What Institutions Can Do, Jenzabar, Inc..

Kafka. A. C. (2021). *Building Students' Resilience: Strategies to Support Their Mental Health,* Chronicle of Higher Education.

Lautman, O. (2017). Five Things That Make Israelis Who We Are: Entrepreneurs. *OLM Consulting*. https://olm-consulting.com/five-things-make-israelis-entrepreneurs/

Markowitz. E. (2021). Covid Impact: Online Learning Gains Favor, Student Mental Health Suffers, *Fierce Education*.

Schein, E. H. (1985). *Organizational Culture and Leadership*, Jossey-Bass, San Francisco, CA.

Schein, E. H. (1990). Organizational culture, *American Psychologist* **45** (2), pp. 109-119. doi:10.1037/0003-066X.45.2.109.

Schuch, F.B., Vancampfort, D., Firth, J., Rosenbaum, S., Ward, P. B., Silva, E. S., Hallgren, M., Ponce De Leon, A., Dunn, A.L., Deslandes, A.C., Fleck, M.P., Carvalho, A.F., Stubbs, B. (2018). Physical Activity and Incident Depression: A Meta-Analysis of Prospective Cohort Studies, *American Journal of Psychiatry* **175** (7), pp. 631-648.

Senor, D. & Singer, S. (2011). *Start-up Nation: The story of Israel's Economic Miracle*, Twelve.

Appendix 1. The documents analyzed in this research

Document No.	**Title**
Just before Spring 2019-2020 semester: Documents 1-15	
1	Since the Technion was expected to shut down in the near future, the Technion management sent a letter to all its students, teaching staff, and administrative staff, delivering a calming message and stating that the Technion was making all necessary preparations to start the Spring semester remotely. Online remote learning was mentioned for the first time. It was also decided to avoid delaying students' graduation. With respect to physical education, it was decided to continue to operate the physical education courses that were planned for the Spring 2019-2020 semester in general, and specifically for students who were nearing the end of their studies.
2	Correspondence between the head of the Humanities and Arts Department and the head of the Physical Education Unit (first author of this paper) regarding the first alternative for facilitating physical education courses during the pandemic.
3	Details of the first alternative for the physical education courses program during the pandemic are discussed in Document 2.
4	March 14, 2020: Email from the Technion's general director to all Technion students and employees conveying COVID-19 updates.
5	March 15, 2020: Email from the Technion's president to all Technion students and employees conveying the Technion's approach to the next stage of the pandemic.
6	March 16, 2020: Email from the Dean of Undergraduate Studies to all Technion students regarding the cancellation of their enrollment in the physical education courses in the Spring 2019-2020 semester. Students in the last semester who needed to complete their physical education requirements were requested to approach the undergraduate office in their faculty.
7	March 13, 2020: List of courses proposed by the head of physical education for facilitation in the Summer 2019-2020 semester.
Spring 2019-2020: Documents 8-15	

8	April 21, 2020: List of online courses proposed by of the head of physical education for the continuation of the Spring 2019-2020 and Summer 2019-2020 semesters.
9	May 20, 2020: National emergency regulations for gyms.
10	May, 11, 2020: Technion's emergency regulations for gyms.
11	May 14, 2020: Undergraduate policy regarding registration to the short Spring 2019-2020 semester.
12	The Ministry of Health's regulations for sports units in different organizations, specifically regarding the use of sports facilities during the pandemic.
13	Course schedule for the Spring 2019-2020 semester.
14	A message to all undergraduate students regarding the short Spring semester (that began late in the Spring 2019-2020 semester).
15	Instructions compiled by the Technion's Safety Unit regarding physical education courses during the pandemic, including a list of courses for the short Spring Semester 2019-2020.
Summer 2019-2020: Documents 16-18	
16	Course schedule for the Summer 2019-2020 semester.
17	Students' feedback to the survey distributed at the end of the Short Spring 2019-2020 semester (on July 31, 2020).
18	Online seminar for the teaching staff.
Winter 2020-2021: Documents 19-22	
19	Instructions for the physical education teachers in preparation for the online Winter 2020-2021 semester.
20	List of online courses offered in the Winter 2020-2021 semester.
21	Students' feedback to the survey distributed at the end of the online Winter 2020-2021 semester.
22	Announcement of the end of mandatory attendance in the courses in the Winter 2021-2022 semester, 9 weeks into the semester, due to the outbreak of the Omicron variant.

Appendix 2. The Technion's policy in each semester
during the pandemic with respect to physical education

(The document numbers mentioned in Appendix 2 refer to Appendix 1.)

Date	**Technion activities and policy with respect to physical education**
March 2020, towards the opening of the Spring 2019-2020 semester (on March 18, 2020): 200 courses were ready to begin at all of the Technion's on-campus facilities, as well as off-campus facilities used (e.g., the Haifa beach).	
Prior to Spring 2019-2020 semester (6 days: 11-17, March 2020)	
March 11, 2020	Since the Technion was expected to shut down in the near future, the Technion management sent a letter to all its students, teaching staff, and administrative staff, in order to deliver the message that the Technion was making all necessary preparations to start the Spring semester remotely. See Document 1. Online remote learning was mentioned for the first time.

	It was also decided: • to avoid delaying students' graduation and to provide all students who were in their last semester the opportunity to complete their studies. • to continue operating the physical education courses that were planned for the Spring 2019-2020 semester in general, and specifically for students who were nearing their graduation. Different options were considered, including recorded lessons and lectures on different topics related to physical education. See Documents 2 and 3.
March 12, 2020	• The government decided to shut down all academic institutions in Israel.
March 14, 2020	• Discussions about how to continue offering physical education courses continued. Some ideas were rejected due to safety reasons. For example, one of the options considered was to offer students a list of videos of physical education lessons, from which each student could choose two and exercise with them. If the student had questions, he or she could approach the teacher by email. This option was rejected because in this scenario, the teacher cannot see the students and cannot ensure their safety. • The Technion's sports center, swimming pool, and gym were closed.
March 16, 2020	• Student enrollment in all physical education courses in the 2019-2020 Spring semester was canceled. Students in their last semester who had not yet completed their physical education requirements were asked to approach their faculty undergraduate office to find a solution. See Document 6.
Spring 2019-2020 semester	
Semester starts: March 18, 2020	• The Technion moved to online learning. • Only two physical education courses (debate and chess), which include mainly theoretical content, were offered online and only to students in their last semester who were nearing graduation. • The Technion's human resources department distributed a pre-recorded relaxation and meditation lesson, presented by one of the Yoga teachers, to all Technion employees.
April 4, 2020	First lockdown in Israel began, lasting until April 18, 2020.
Short Spring 2019-2020 semester	
May 31, 2020 - July 31, 2020: 9 weeks (instead of 13 weeks of a regular semester)	• After the lookdown ended, a decision was made to offer students physical education courses on-campus in accordance with to the Purple Regulations. See Documents 9-15. • Outdoor sports facilities were built for these courses (see Figure 3, in Section 4.3). • Students in advanced semesters were given priority in enrollment. • The first end-of-semester survey was distributed. See Document 17.
August 1-15, 2020	• Teachers' training: An online workshop for the Technion's physical education staff was held, focusing on pedagogical methods to be used in courses taught according to the Purple Regulations. See Document 18.
Summer 2019-2020 semester	
	• A small number of outdoor courses were offered on campus in accordance with the Purple Regulations. See Document 16.

Winter 2020-2021 semester: Online	
	• All physical education courses were taught remotely via Zoom. • 95 courses were opened compared with 210 in a regular semester prior to the pandemic. See Document 20. • Since the courses could not be taught as planned, on campus, using the required sports facilities (e.g., swimming in the swimming pool), course contents were adjusted to include mainly physical fitness workouts targeting the respective sport. For example, the volleyball course emphasized the skills needed for this sport, such as jumping, muscle strength, and agility. • A workshop for the Technion's physical education staff was facilitated in cooperation with the Technion's Center for the Promotion of Learning and Teaching. The workshop focused on how to make remote physical education lessons active and safe (rather than passive). See Document 19. • The second end-of-semester survey was distributed. See Document 21.
Spring 2020-2021 and Summer 2020-2021 semesters	
	• Courses were taught on campus. • Green Regulations were applied, restricting the participation in these courses only to vaccinated students and students who had recovered from COVID-19.
Winter 2021-2022 Semester	
	• During the first nine weeks of the semester, physical education classes took place as planned without any restrictions. • Groups were relatively small. • January 3, 2022: Due to the outbreak of the Omicron variant, attendance in the physical education classes was not mandatory for the last three weeks of the semester. Students could attend the lessons on-campus if they wished; only a few students showed up. See Document 22.
Spring 2020-2021 semester	
	• Back to normal: All COVID-19 restrictions were lifted in Israel. • The number of students who registered for physical education courses returned to pre-pandemic values. See Table 1.